Drive Responsibly Technical Report - Phase 1

Team 2 - 11 am

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4 October 2021

CS 373: Software Engineering

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Motivation

The rise in breweries gives pause to civilians - are they in any way hurting the safety of the city? The website will examine the relationship between Texas counties, the breweries within them and the frequency of traffic incidents. With an in-depth look at the nature, severity and frequency of traffic incidents and the number of breweries, both on a county-level, users can deduce potential patterns or conclusions from the comparison of the data.

User Stories

User stories were provided by our customer group My NutriPal.

User Story #1: Flags for high numbers of traffic incidents

User Request: I want to be able to easily tell if a given county has too many traffic incidents occurring, maybe by using flags that convey a certain threshold of incidents (>100 incidents, >500 incidents).

Implementation: We are keeping track of the county of each traffic incident using the traffic API, so we can use that data that we've collected to count the number of incidents per county and then add the flags. If we need to, we can also add a timeframe for the incident flags using data from the same API.

User Story #2: Mapping the probability of incidents

User Request: I want to use the accident data from Drive Responsibly with google maps to see what roads have a high likelihood of traffic incidents so I can avoid them and take the safest route.

Implementation: The traffic API provides us with the type of incident (such as congestion or car accident) as well as the location via latitude/longitude and street name. Using this we can map the car accidents using the location data to show which streets are the safest.

User Story #3: Flags for number of breweries in a county

User Request: I would like counties that reach certain milestones for a total number of breweries to be signified with different flags, making them easily distinguishable at a glance.

Implementation: Just as with traffic incidents, one of the attributes we are tracking for breweries is the county it is in, so we can use this data to count the number of breweries per county and then add the flags.

User Story #4: Graph of traffic incidents over time

User Request: I would like to have a graph that displays the change in incidents over time. This could then be used to see how specific events may have led to fluctuations in the number of accidents.

Implementation: We can already associate traffic incidents with counties using the location data provided by the traffic API. This, along with the time data provided, can be used to create a graph of traffic incidents over time for each county.

User Story #5: Stats page

User Request: I suggest that you make a stats page with significant figures from different years and different demographics to emphasize the severe negative impact of drunk driving.

Implementation: the traffic API doesn't track any data relating to the people that may have been a part of the traffic incidents so we can't do much about demographics other than generalizations about the county it was in. We could still make a stats page with different data relating to the location of the incidents relative to breweries such as the average number or severity of incidents within a given range of a brewery.

RESTful API

Postman Documentation: https://documenter.getpostman.com/view/10582451/UUy4ckUf

Model Endpoints:

The following endpoints will return all of the instances in the specified model.

Breweries

- GET https://www.driveresponsibly.me/api/breweries?page_size&brewery_type&city&min_created_at&max_created_at&state&min_latitude&max_latitude&min_longitude&max_longitude
  - Returns all of the breweries in Texas. There are a list of query parameters that the user can include to specify what breweries to show, all of which are documented on the provided Postman documentation:
    - page_size
    - brewery_type
    - city
    - min_created_at
    - max_created_at
    - state
    - min_latitude
    - max_latitude
    - min_longitude
    - max_longitude

Counties

- GET https://www.driveresponsibly.me/api/counties?page_size&min_P1_001N&max_P1_001N&GEO_ID&state&min_H1_002N&max_H1_002N&min_H1_003N&max_H1_003N
  - Returns all of the counties in Texas. There are a list of query parameters that the user can include to specify what counties to show, all of which are documented on the provided Postman documentation:

        - page_size
        - min_P1_001N
        - max_P1_001N
        - GEO_ID
        - state
        - min_H1_002N
        - max_H1_002N
        - min_H1_003N
        - max_H1_003N

Traffic Incidents

- GET https://www.driveresponsibly.me/api/traffic_incidents?page_size&type&severity&eventCode&min_distance&max_distance&min_delayFromFreeFlow&max_delayFromFreeFlow
    - Returns all of the traffic incidents in Texas. There are a list of query parameters that the user can include to specify what traffic incidents to show, all of which are documented on the provided Postman documentation:
        - page_size
        - type
        - severity
        - eventCode
        - min_distance
        - max_distance
        - min_delayFromFreeFlow
        - max_delayFromFreeFlow

Instance Endpoints:

Brewery

- GET https://www.driveresponsibly.me/api/breweries/:Id
  - Returns the brewery with the provided id (required).

County

- GET https://www.driveresponsibly.me/api/county/:Id
  - Returns the county with the provided id (required).

Traffic Incident

- GET https://www.driveresponsibly.me/api/traffic_incident/:Id
  - Returns the traffic incidents with the provided id (required).

Models

Breweries - 343 in Texas[1]

- Type - type of brewery (micro, nano, regional, brewpub, large, planning, bar, contract, proprietor, closed)[2]
- ID - the brewery ID (int)
- created_at: the time that the brewery was added as an entry to Open Brewery DB (string)
- County - the county that the brewery is located in. (string)
- City - the city that the brewery is located in. (string)
- State - the state the brewery is located in. (string)
- Name - the name of the brewery. (string)

[1] Brewery DB GitHub: https://github.com/openbrewerydb/openbrewerydb/tree/master/data/united-states

[2] List of Breweries: https://www.openbrewerydb.org/documentation/01-listbreweries#by_type

- Latitude - the latitudinal position of the brewery in degrees. (floating point number)
- Longitude -the longitudinal position of the brewery in degrees. (floating point number)
- Phone Number - the brewery’s phone number. (10 digit integer)
- Address - the street address of the brewery. (string)
- Website - the brewery’s website URL. (string)

Counties - 254 in Texas

- Name - the name of the county (string)
- County ID - the id number of the county, same as the last three digits of GEO_ID (int)
- GEO_ID - the census geographic identifier for the county. The first three digits represent the summary level of the data, the next four represent the 2-digit geographic variant and the 2-digit geographic component, and the digits after US are the 2-digit state code and the 3-digit county code. (string)
- State - the state that the county is located in (2 digit int)
- P1_001N - the total population of the county (int)
- H1_002N - the total occupancy status of the county (int)
- H1_003N - the total vacancy status of the county (int)

Traffic Incidents - about 1,000

- Type - the type of traffic incident. 1 = construction, 2 = event, 3 = congestion/flow, 4 = incident/accident. (1-4 integer)
- Severity - the severity of the incident ranging from 0-4 where 4 is the most severe. (0-4 integer)
- Start time - the start time of the incident. (ISO 8601 Combined Date and Time format in string)
- End time - the end time of the incident. (ISO 8601 Combined Date and Time format in string)

- County - the county the incident occurred in. (string)
- Latitude - the latitudinal position of the incident in degrees. (floating point number)
- Longitude - the longitudinal position of the incident in degrees. (floating point number)
- City - the city that the incident occurred in. (string)
- State - the state that the incident occurred in. (string)
- Event Code - the Alert-C event code of the event. (1-2047 integer)

Tools

AWS

We used AWS to host the frontend.

Discord

We used Discord to communicate with each other and discuss project details.

Docker

We used Docker to package the backend and frontend into a container. We also made makefiles.

Ed Discussion

We used Ed Discussion to read answered questions from the class and teaching staff.

Flask

We used Flask for our backend framework.

GitLab

We used GitLab to store and manage our repository for the project. We made issues to keep track of, watch for merge requests and have a main point of reference for the project files.

Postman

We used Postman to document the API.

React

We used React for our frontend development framework.

Hosting

The site is hosted at: https://www.driveresponsibly.me/#/

The website is hosted using AWS, and our domain was acquired from NameCheap.

Sources

Format of Technical Report:

https://medium.com/technical-writing-is-easy/how-to-write-technical-report-e935210002c9

Title Page:

https://web.mit.edu/course/21/21.guide/title.htm

Example Technical Report:

https://web.mit.edu/course/21/21.guide/rep-resc.htm

Books4You Technical Report:

https://gitlab.com/cs373-group14/books4u/-/blob/master/Technical_Report.pdf

Note: used this for formatting the report and knowing what to include/not include. Additionally, the phrase, “filter/sort” used in the Books4You technical report is loosely used in the RESTful API portion of this technical report, particularly the description of the endpoints, including specifying required id. Also, I got help on the “Hosting” section for this technical report.

Postman Documentation Example 1:

https://documenter.getpostman.com/view/12084061/Tz5jdKfE#c85fd3a3-8a18-403e-9b22-7f6c9a560ade

Postman Documentation Example 2:

https://documenter.getpostman.com/view/12123261/TVRdAWse

Postman Documentation Example 3:

https://documenter.getpostman.com/view/12817007/TVYPztiN

Brewery API:

https://www.openbrewerydb.org/documentation/01-listbreweries#by_state

County API:

https://www.census.gov/data/developers/data-sets/decennial-census.html

Traffic Incident API:

https://developer.mapquest.com/documentation/traffic-api/incidents/get/

Latitude/Longitude API:

https://developers.google.com/maps/documentation/geocoding/overview#ReverseGeocoding